

What is claimed is:

1. A method for chronic pain patient medical resources forecasting, comprising:
  - selecting direct medical indicia associated with chronic pain that serve as independent variables;
  - selecting indirect medical indicia associated with chronic pain that serve as independent variables;
  - selecting non-medical indicia associated with chronic pain that serve as independent variables;
  - selecting a chronic pain indication that serves as a dependent variable;
  - creating a chronic pain forecasting model using direct medical indicia, indirect medical indicia, non-medical indicia, and chronic pain indication;
  - applying the chronic pain forecasting model to a chronic pain patient to create a patient mathematical expression; and,
  - forecasting medical resources for a chronic pain patient by comparing each patient mathematical expression to selection objectives.
2. The method as in claim 1 wherein the chronic pain forecasting model comprises
  - a logic structure to define a logical decision process to operate on the independent variables and to progressively reach greater certainty about the chronic pain patient forecast;
  - weighted variables to reflect greater relevance of certain direct medical indicia, indirect medical indicia, and non-medical indicia to the chronic pain indication; and,
  - equations that represent relationships between or among weighted variables to form a chronic pain inference engine.

3. The method as in claim 2 wherein the chronic pain forecasting inference engine comprises,  
at least fifty dependent variables;  
at least thirty independent variables; and,  
at least fifty equations.
4. The method as in claim 2 wherein the logic structure is developed using Chi-Square Automatic Interaction Detection (CHAID) analysis to establish relationships between a dependent variable and independent variables.
5. The method as in claim 2 wherein the logic structure is developed using Classification Adjusted Regression Tree (CART) analysis to establish relationships between the dependent variable and the independent variables.
6. The method as in claim 2 wherein the weighted variables are developed using logistical regression to establish relationships between the dependent variable and independent variables.
7. The method as in claim 2 wherein the weighted variables are developed using discriminate analysis to establish relationships between the dependent variable and independent variables.
8. The method as in claim 2 wherein appropriateness of patient indicia is evaluated using the Hosmer-Lemeshow Goodness of Fit Analysis.
9. The method as in claim 1 wherein the chronic pain patient's forecast is identified with a patient mathematical expression generated by the chronic pain inference engine operating on the patient indicia and the chronic pain indication.

10. The method as in claim 1 wherein the patient indicia are monitored for changes and the patient mathematical expression is updated when patient indicia change.
11. The method as in claim 1 wherein forecasted medical resources costs are adjusted by a medical financial index to improve accuracy of the forecasted medical resources costs over time.
12. The method as in claim 11 wherein the medical financial index is selected from the group consisting of Consumers Price Index (CPI) Medical and Healthcare Financing Administration (HCFA) Hospital Market Basket.
13. The method as in claim 1 further comprising,  
establishing categorization preferences that specify patient forecast characteristics that are desired to be selected;  
calculating the categorization preferences with each chronic pain patient's mathematical expression to identify relationships between the categorization preferences and each potential chronic pain patient's mathematical expression; and,  
categorizing each chronic pain patient based upon the relationships between the categorization preferences and each chronic pain patient's mathematical expression.
14. The method as in claim 13, further comprising,  
considering each chronic pain patient based upon lifestyle choices to adjust categorization.
15. The method as in claim 14 wherein lifestyle choices are selected from the group consisting of smoking, alcohol consumption, obesity, job choice, activity level, sporting activities, seatbelt use, and helmet use.

16. The method as in claim 1 wherein the selection objectives are selected from the group consisting of treatment time period, experimental procedures, invasive procedures, back-to-work date, standard of care, case manager for care, and treatment provider names.
17. The method as in claim 1 wherein the direct medical indicia are related to chronic pain in a known medical manner and recorded by a clinician.
18. The method as in claim 17 wherein the direct medical indicia are independent variables selected from the group consisting of primary diagnosis, associated secondary diagnosis, co-morbidities, drug treatment regimen, telephone consultations with a clinician, trauma episodes, palliative care, rehabilitative care, clinician office visits, emergency room visits, and hospitalizations.
19. The method as in claim 17 wherein the sources for direct medical indicia are selected from the group consisting of claims records, medical records, workers' compensation records, and employer records.
20. The method as in claim 1 wherein indirect medical indicia are a chronic pain co-morbidity that is recorded by a clinician.
21. The method as in claim 20 wherein the indirect medical indicia are independent variables selected from the group consisting of mental health condition, acute respiratory episodes, diabetes, and heart failure.
22. The method as in claim 20 wherein the sources for indirect medical indicia are selected from the group consisting of claims records, medical records, workers' compensation records, employer records, and patient surveys.
23. The method as in claim 1 wherein the non-medical indicia are independent variables selected from the group consisting of pain perception factors, life satisfaction measures,

patient support structure, day-time distractions, marital relationship quality, and job satisfaction.

24. The method as in claim 23 wherein the sources for non-medical indicia are selected from the group consisting of medical records, patient surveys, patient self-reports, employer databases, workers' compensation records, medical chart reviews, patient interviews, treating clinician interviews, and family member interviews.
25. The method as in claim 1 wherein the chronic pain indication is selected from the group consisting of Peripheral Neuropathy; Stump Pain; Phantom Pain; Complex Regional Pain Syndrome Type I (Reflex Sympathetic Dystrophy); Complex Regional Pain Syndrome Type II (Causalgia); Central Pain; Rheumatoid Arthritis; Osteoarthritis; Sickle Cell Arthropathy; Stiff Man Syndrome; Osteoporosis; Guillain-Barre Syndrome; Superior Pulmonary Sulcus Syndrome (Pancoast Tumor); Pain of Skeletal Metastatic Disease of the Neck, Arm, or Shoulder Girdle; Carcinoma of Thyroid; Post Herpetic Neuralgia; Syphilis (Tabes Dorsalis and Hypertrophic Pachymeningitis); Primary Tumor of a Vertebral Body; Radicular Pain Attributable to a Prolapsed Cervical Disk; Traumatic Avulsion of Nerve Roots; Primary Tumor of a Vertegral Body; Radicular Pain Attributable to a Thoracic Disk; Chemical Irritation of the Brachial Plexus; Traumatic Avulsion of the Brachial Plexus; Postradiation Pain of the Brachial Plexus; Painful Arms and Moving Fingers; Brachial Neuritis (Brachial Neuropathy, Neuralgic Amyotrophy, Parsonage-Turner Syndrome); Raynaud's Disease; Raynaud's Phenomenon; Frostbite and Cold Injury; Brythema Pernio (Chilblains); Acrocyanosis; Livedo Reticularis; Volkmann's Ischemic Contracture; Thromboangiitis; Intermittent Claudication; Rest Pain; Gangrene Due to Arterial Insufficiency; Other Postinfectious and Segmental

Peripheral Neuralgia; Angina Pectoris; Postmastectomy Pain Syndrome (Chronic Nonmalignant); Late Postmastectomy Pain or Regional Carcinoma; Segmental or Intercostal Neuralgia; Chronic Pelvic Pain Without Obvious Pathology; Pain from Urinary Tract; Carcinoma of the Bladder; Lumbar Spinal or Radicular Pain after Failed Spinal Surgery; Spinal Stenosis (Cauda Equina Lesion); Pain referred from Abdominal or Pelvic Viscera or Vessels Perceived as Sacral Spinal Pain; Femoral Neuralgia; and, Sciatica Neuralgia.

26. The method as in claim 25 wherein the source for chronic pain indications is the International Association for the Study of Pain (IASP) chronic pain guidelines.
27. The method as in claim 1 wherein the chronic pain patients are selected from the group consisting of payer database, employer database, clinician database, and workers' compensation database.
28. A method for chronic pain patient dynamic medical resources forecasting, comprising:
  - accessing a chronic pain forecasting model having direct medical indicia, indirect medical indicia, non-medical indicia, and a chronic pain indication that are arranged logic structure, with weighted variables, and equations representing relationship between or among the variables;
  - applying the chronic pain forecasting model to a chronic pain patient to create a patient mathematical expression;
  - forecasting chronic pain patient medical resources by comparing each patient mathematical expression to selection objectives;
  - establishing categorization preferences that specify characteristics of a forecast that are desired to be categorized;

calculating the categorization preferences with each chronic pain patient's mathematical expression to identify relationships between the categorization preferences and each potential chronic pain patient's mathematical expression;

categorizing the forecast based upon the relationships between the categorization preferences and each chronic pain patient's mathematical expression; and,

monitoring the chronic pain patient's direct medical indicia, indirect medical indicia, and non-medical indicia for changes and updating the patient's mathematical expression based upon changes to the potential chronic pain patient's direct medical indicia, indirect medical indicia, and non-medical indicia.

29. A computer software product that includes a medium readable by a computer, the medium having stored thereon instructions for forecasting chronic pain patient medical resources, comprising:
- a first set of instructions when executed by the computer, causes the computer access a chronic pain forecasting model having direct medical indicia, indirect medical indicia, non-medical indicia, and a chronic pain indication that are arranged logic structure, with weighted variables, and equations representing relationship between or among the variables;
  - a second set of instructions when executed by the computer, causes the computer to applying the chronic pain forecasting model to a chronic pain patient to create a patient mathematical expression; and,
  - a third set of instructions when executed by the computer, cause the computer to forecast chronic pain patient medical resources comparing each patient mathematical expression to selection objectives.

30. The computer software product as in claim 29, further comprising,
- a fourth set of instruction when executed by the computer, cause the computer to establish categorization preferences that specify characteristic of a forecast that are desired to be categorized;
  - a fifth set of instruction when executed by the computer, cause the computer to calculate the categorization preferences with each chronic pain patient's mathematical expression to identify relationships between the categorization preferences and each chronic pain patient's mathematical expression; and,
  - a sixth set of instruction when executed by the computer, cause the computer to categorize the forecast based upon the relationships between the categorization preferences and each chronic pain patient's mathematical expression.
31. A method for sensitivity analysis of a chronic pain forecasting model, comprising:
- comparing the chronic pain patient's forecast with outside treated chronic pain patient data to create a patient error list;
  - applying an error assessment model to the patient error list to identify the non-corresponding patient indicia that contributed to the errors;
  - applying a sensitivity analysis model to the non-corresponding patient indicia to identify potential patient indicia changes to improve accuracy in forecasting chronic pain patient medical resources;
  - selecting at least one patient indicia change from the potential patient indicia changes to apply to the patient indicia; and,
  - modifying the patient indicia with the at least one selected patient indicia change.
32. The method as in claim 31, further comprising



applying a sensitivity analysis model to the weighted variables to identify potential weighted variable changes to reduce errors in forecasting chronic pain patient medical resources;

selecting at least weighted variable change from the potential weighted variable changes to apply to the weighted variables; and,

modifying weighed variables to reflect greater or lesser relevance of patient indicia to reduce errors in forecasting chronic pain patient medical resources.

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